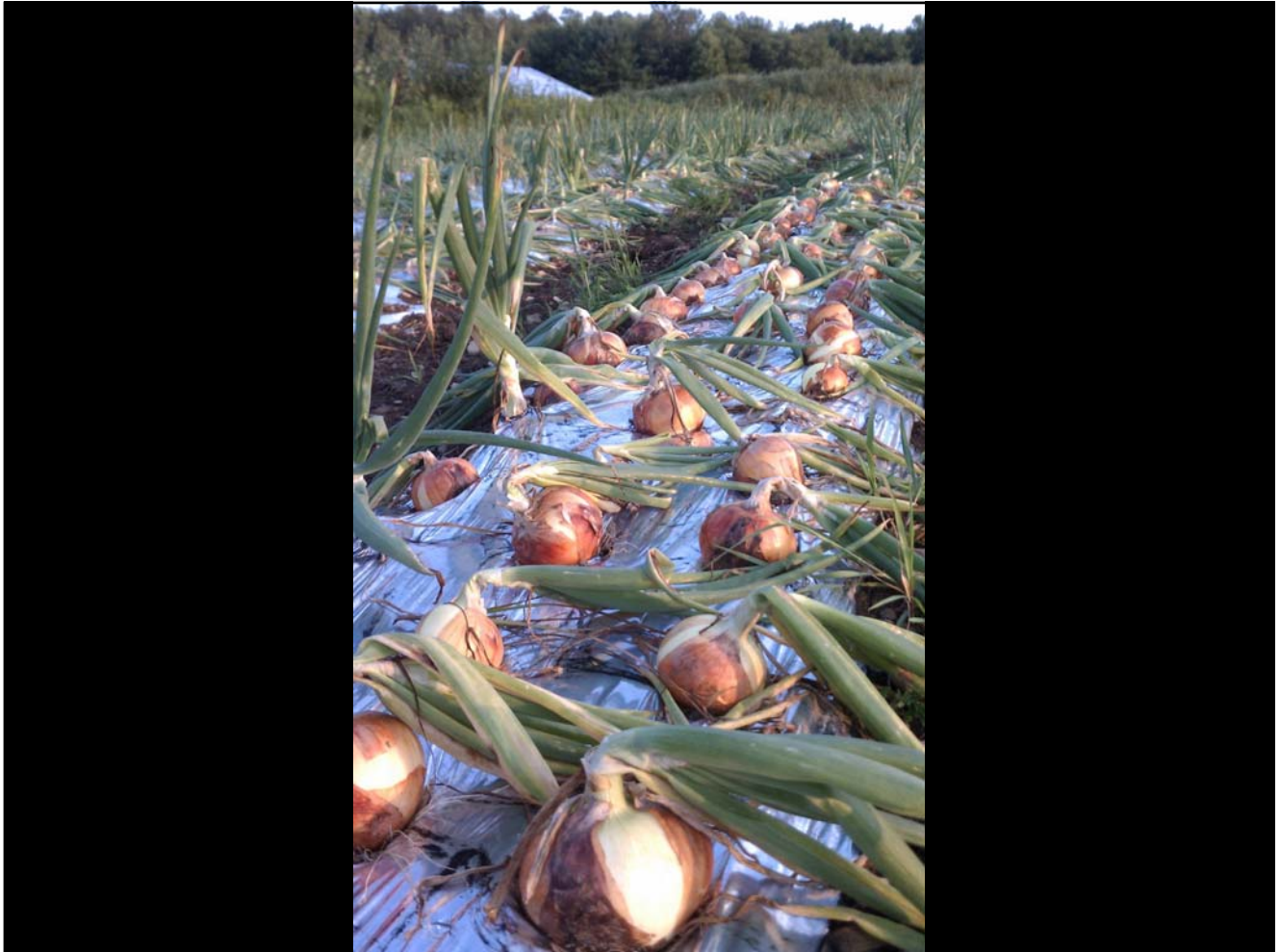


Weed control alternatives in plasticulture vegetables

Judson Reid

Cornell Vegetable Program

Sponsored by NESARE









Why are we looking at alternatives?

- Weed control is essential.
 - Moisture/nutrient competition
 - Insect and disease contribution
 - Labor
- Herbicides are a challenge in plastic mulch systems.
- Herbicides negatively impact the environment.
- Cultivation is labor intensive.

Why Rye?

- Excellent competitor.
- Inexpensive seed.
- When sown in the spring will not form a seed head.

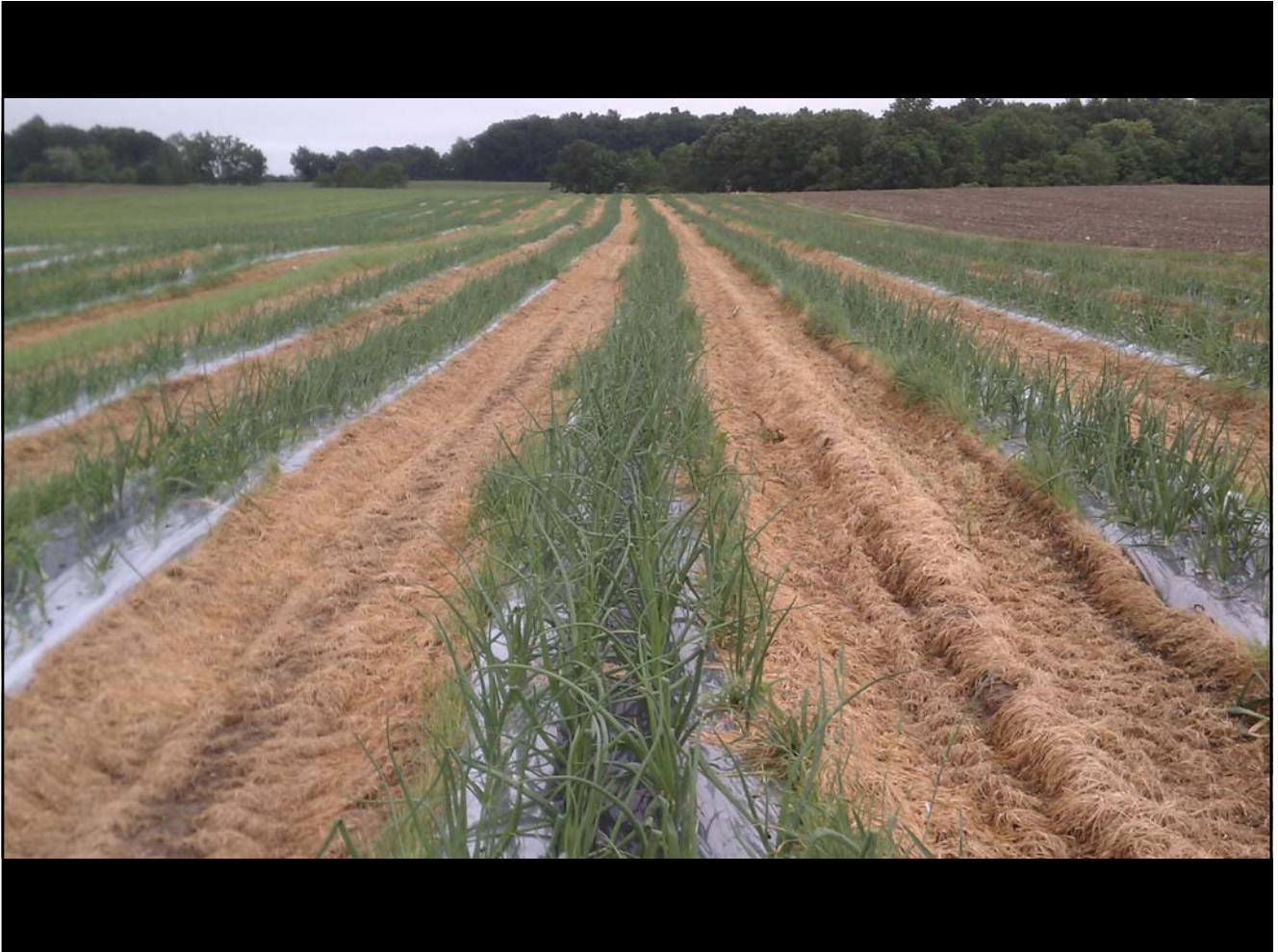
Rye was seeded between plastic on April 10



4 inches of snow on April 20

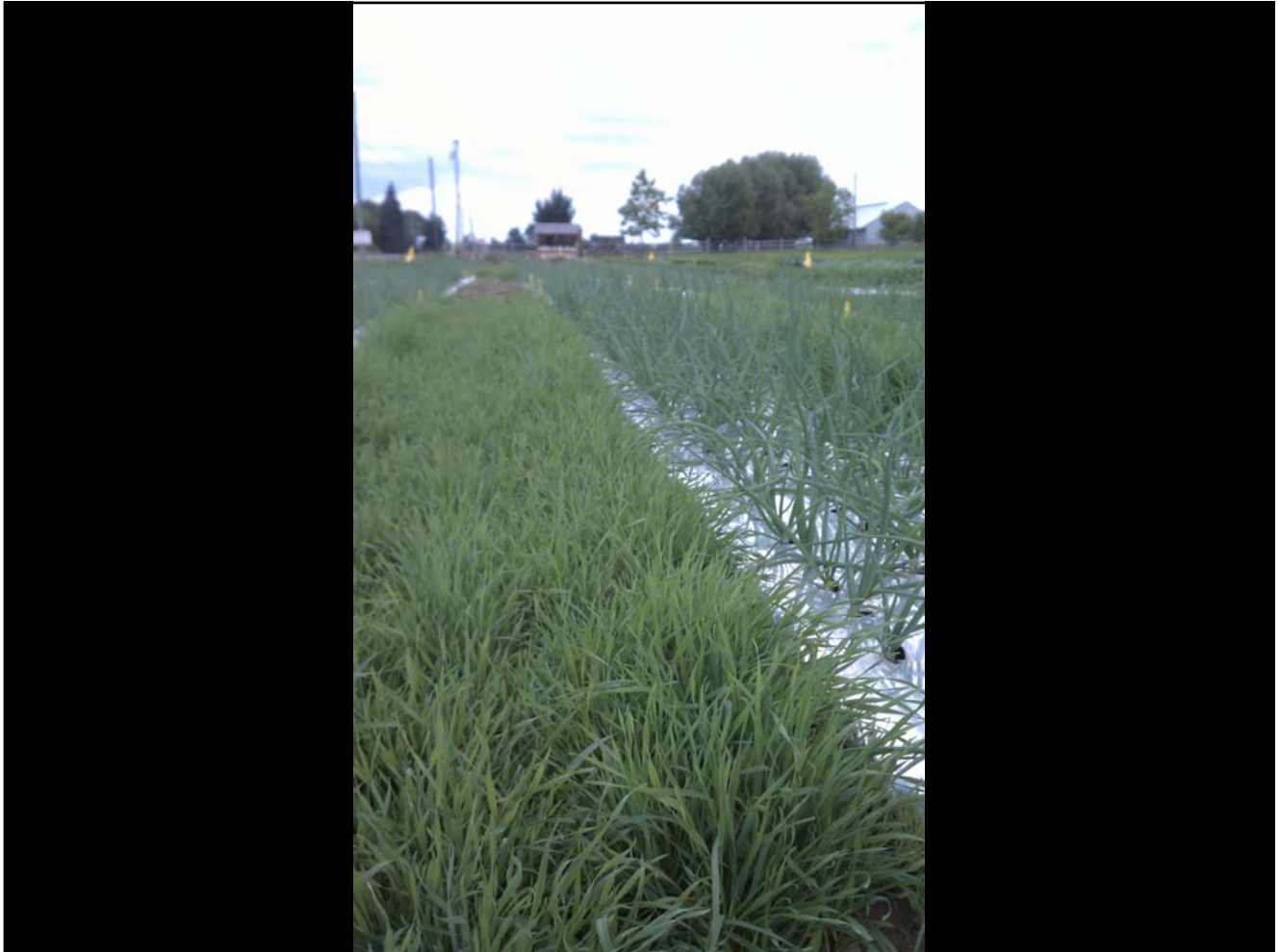




























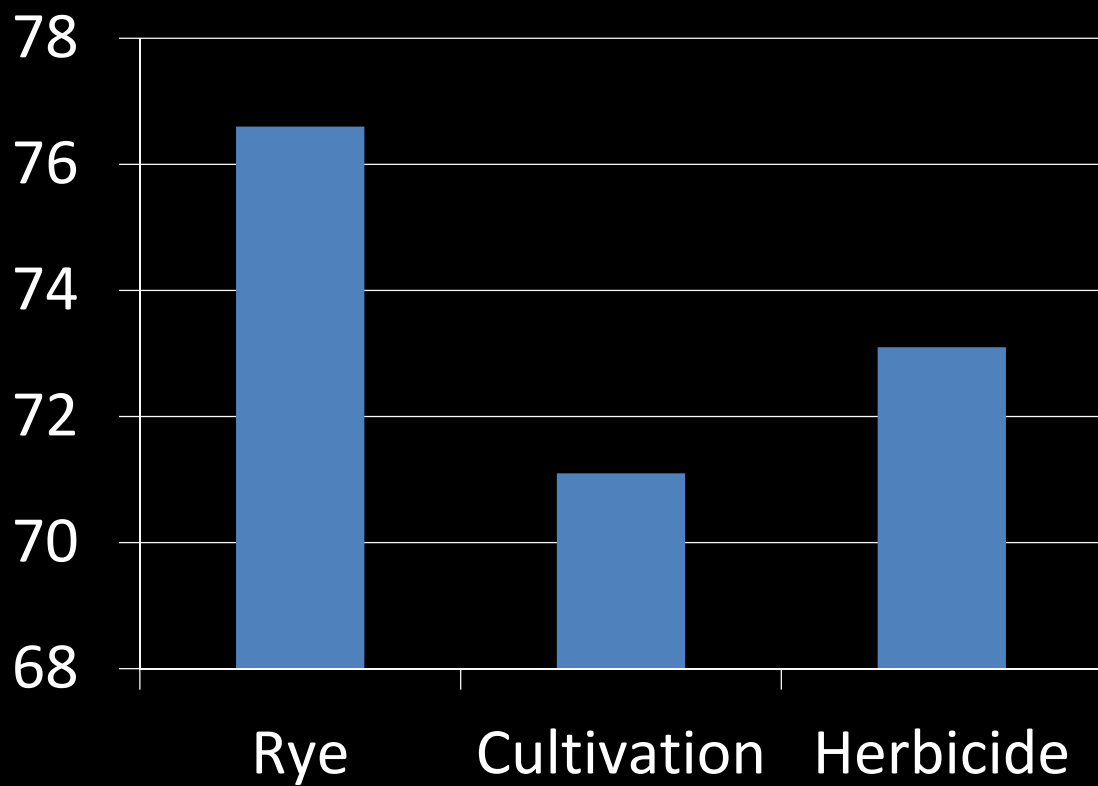


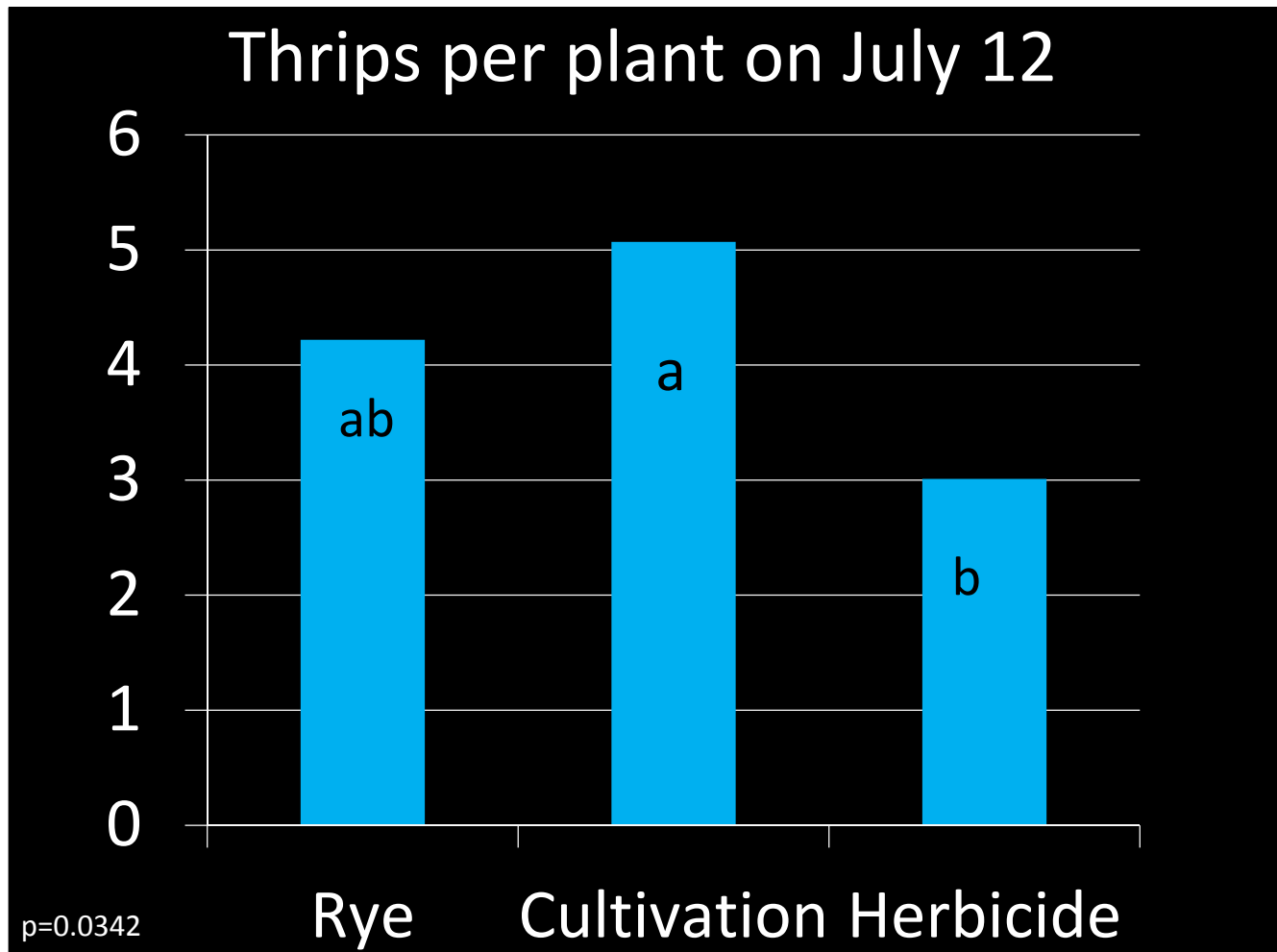


Weight (g) of weeds in 1 sq ft of row middle

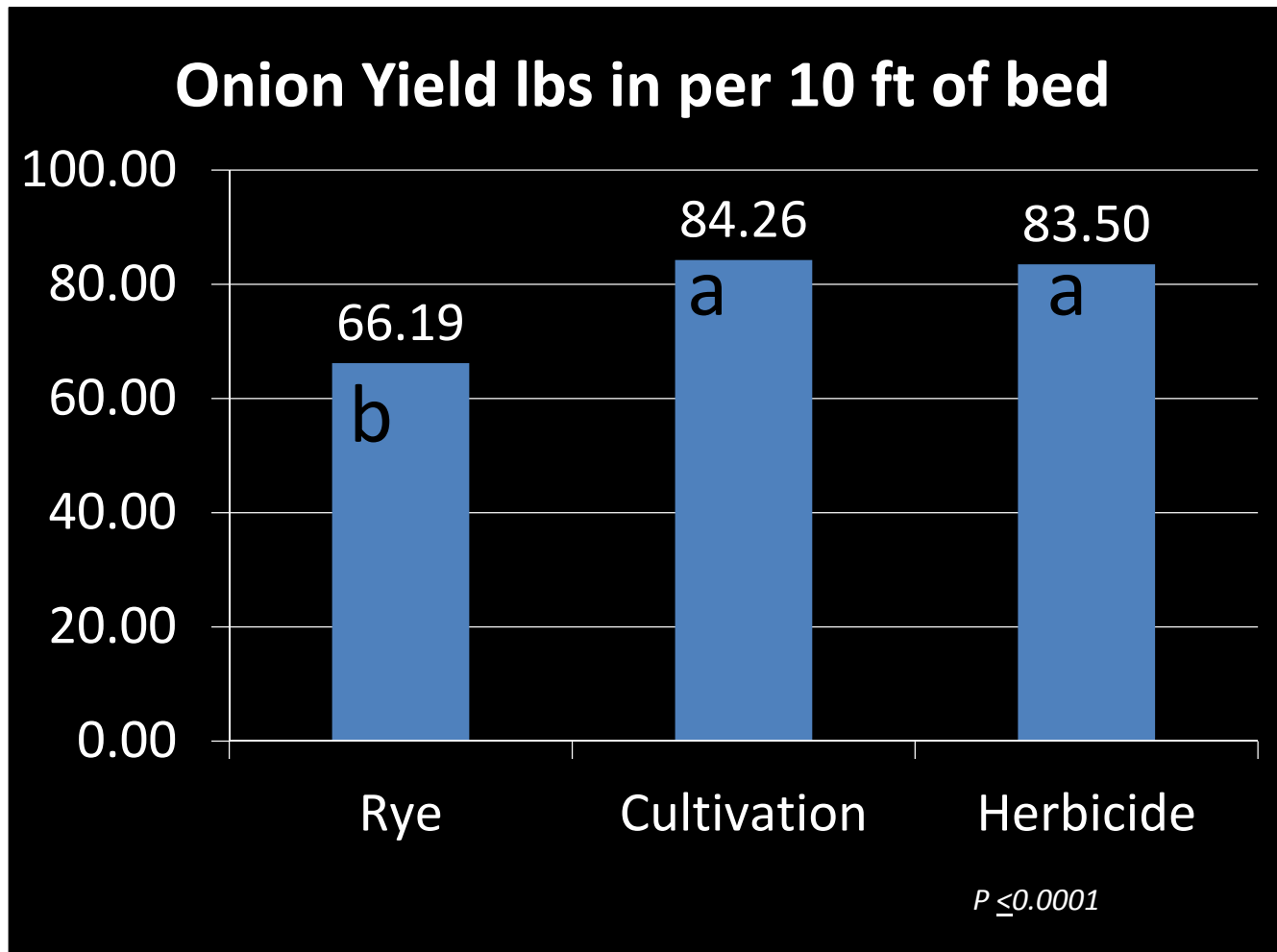
	Onions		
	May 22	June 12	July 3
Rye	0.03	1.28	0.00
Cultivation	1.75	1.15	3.35
Herbicide	0.68	20.58	1.45

Onion height on July 3 in cm

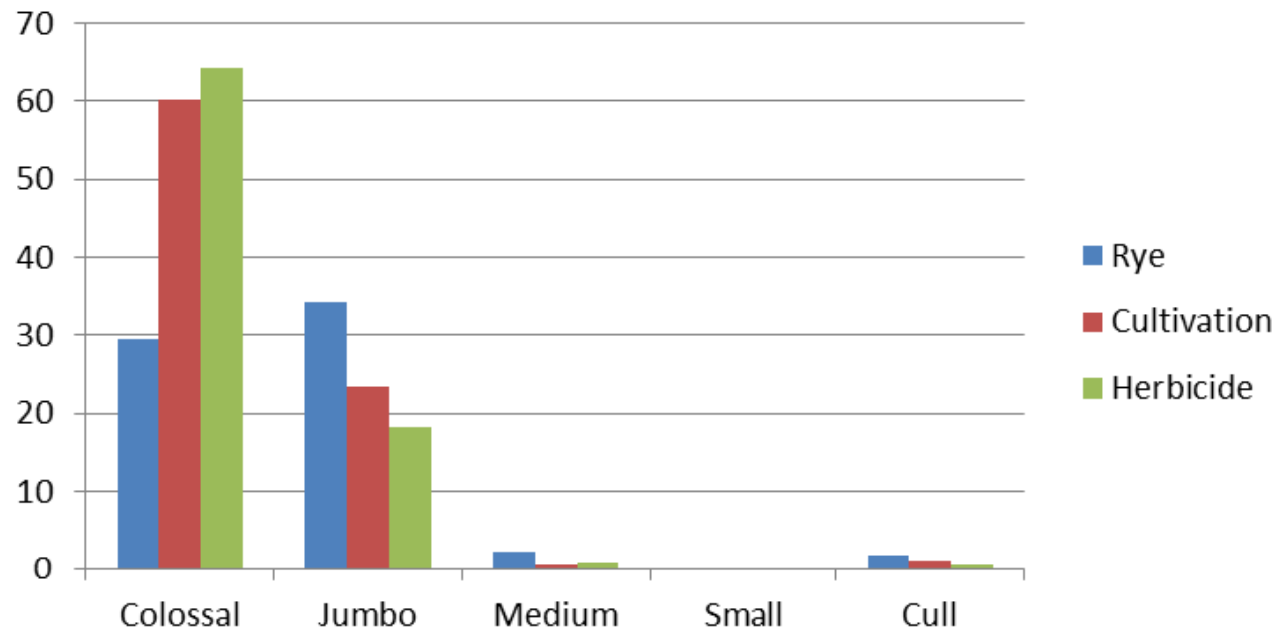








Onion Bulb Grade Distribution

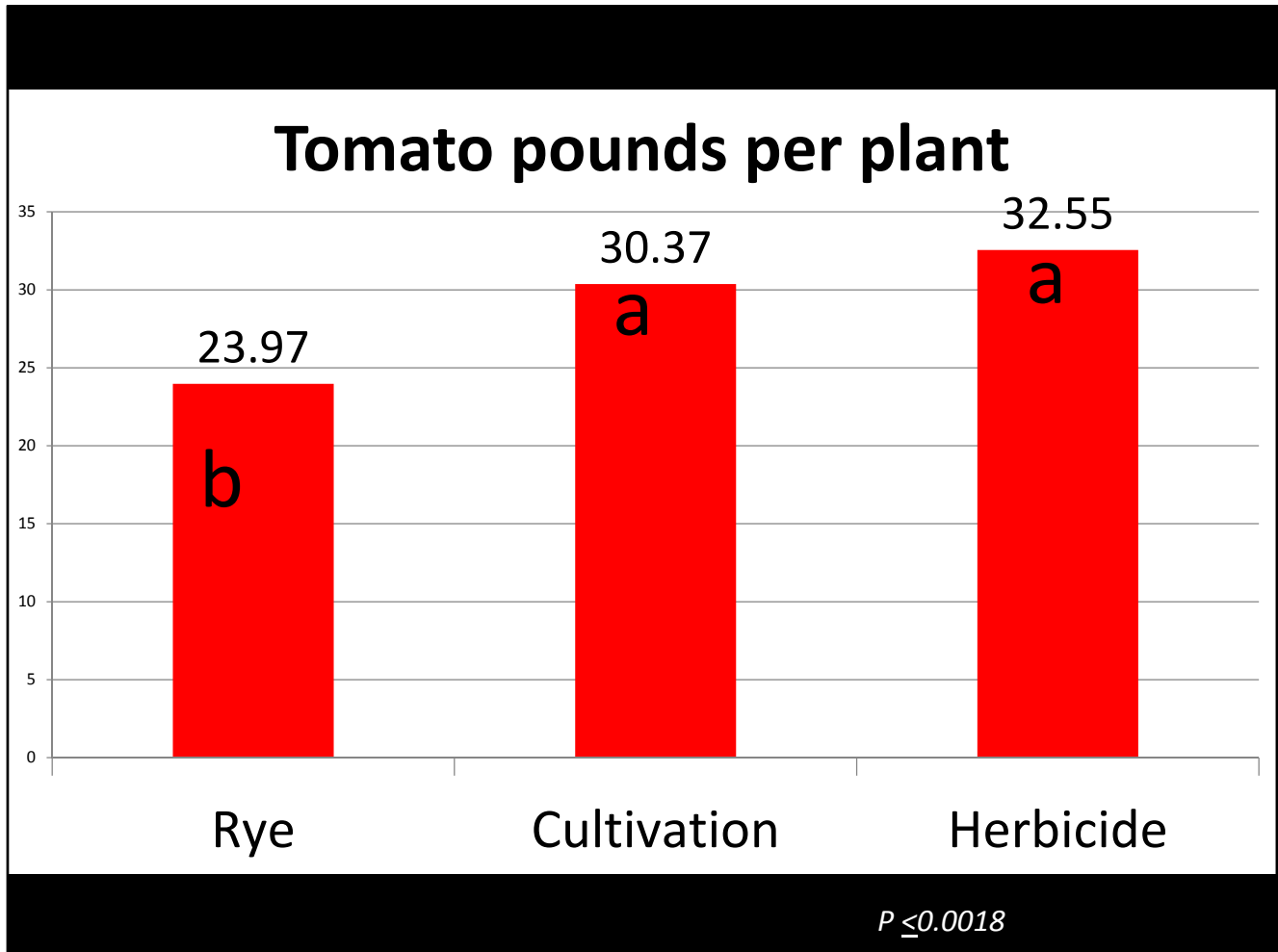


Onion foliar nutrient levels

	July 3			July 24			
	Rye	Cultivated	Herbicide	Rye	Cultivated	Herbicide	
Nitrogen	2.65%	3.21%	3.29%	2.64%	2.92%	2.75%	Deficient
Phosphorus	0.47%	0.45%	0.35%	0.35%	0.25%	0.23%	Low
Potassium	3.38%	3.96%	3.82%	3.35%	4.16%	4.09%	Sufficient
Magnesium	0.30%	0.23%	0.29%	0.42%	0.33%	0.33%	High
Calcium	1.79%	1.22%	1.82%	3.59%	3.30%	3.13%	Excessive
Sulfur	0.73%	0.97%	0.89%	0.67%	0.85%	0.79%	
Boron	27 ppm	27 ppm	25 ppm	31 ppm	33 ppm	32 ppm	
Zinc	13 ppm	15 ppm	15 ppm	13 ppm	13 ppm	10 ppm	
Manganese	54 ppm	69 ppm	71 ppm	75 ppm	109 ppm	118 ppm	
Iron	81 ppm	101 ppm	116 ppm	117 ppm	146 ppm	144 ppm	
Copper	6 ppm	6 ppm	6 ppm	15 ppm	7 ppm	6 ppm	

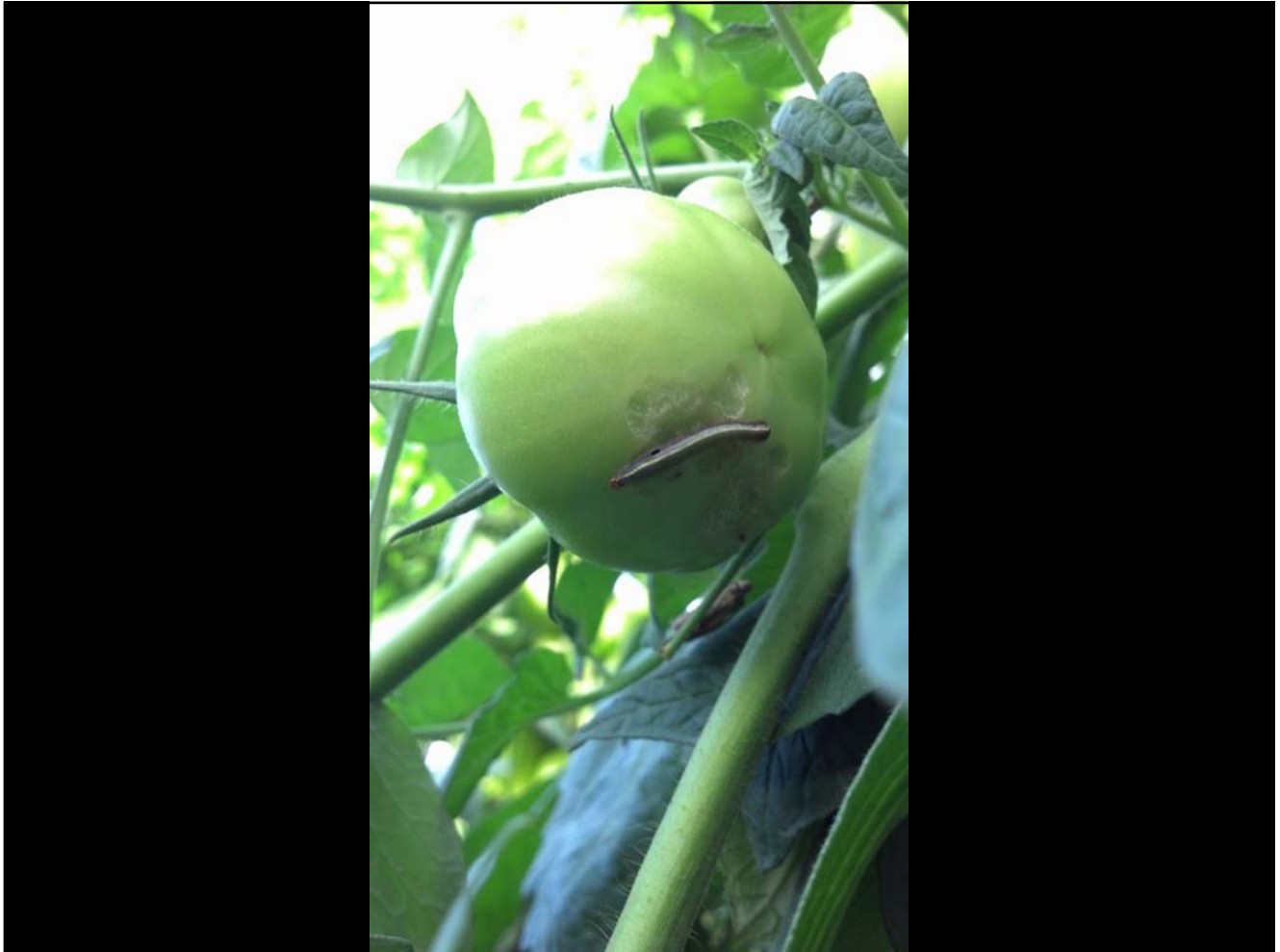
Tomatoes



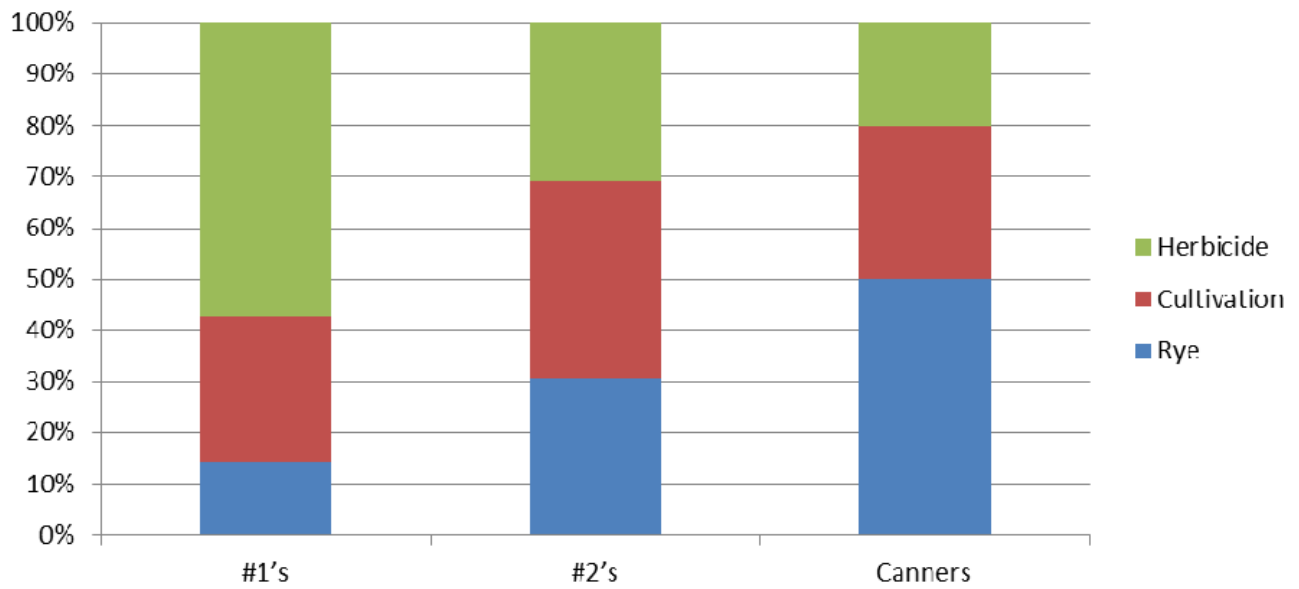


Tomato foliar nutrient levels

	July 3			August 8			September 4		
	Rye	Cultivated	Herbicide	Rye	Cultivated	Herbicide	Rye	Cultivated	Herbicide
Nitrogen	3.93%	4.41%	4.30%	3.44%	3.65%	3.68%	3.63%	4.04%	3.13%
Phosphorus	0.33%	0.47%	0.39%	0.28%	0.26%	0.24%	0.29%	0.31%	0.29%
Potassium	3.50%	4.54%	3.91%	1.99%	3.13%	2.84%	3.10%	4.09%	4.13%
Magnesium	0.58%	0.46%	0.48%	0.66%	0.48%	0.48%	0.73%	0.64%	0.58%
Calcium	4.01%	2.97%	3.46%	7.15%	5.36%	5.30%	6.23%	5.09%	5.27%
Sulfur	0.82%	0.85%	0.89%	1.43%	1.19%	0.98%	1.37%	1.00%	1.20%
Boron	36 ppm	35 ppm	41 ppm	52 ppm	47 ppm	40 ppm	62 ppm	53 ppm	57 ppm
Zinc	26 ppm	31 ppm	24 ppm	23 ppm	28 ppm	28 ppm	34 ppm	48 ppm	45 ppm
Manganese	47 ppm	55 ppm	41 ppm	61 ppm	61 ppm	62 ppm	80 ppm	89 ppm	85 ppm
Iron	173 ppm	169 ppm	145 ppm	97 ppm	78 ppm	88 ppm	137 ppm	141 ppm	158 ppm
Copper	14 ppm	23 ppm	25 ppm	9 ppm	10 ppm	10 ppm	13 ppm	27 ppm	18 ppm

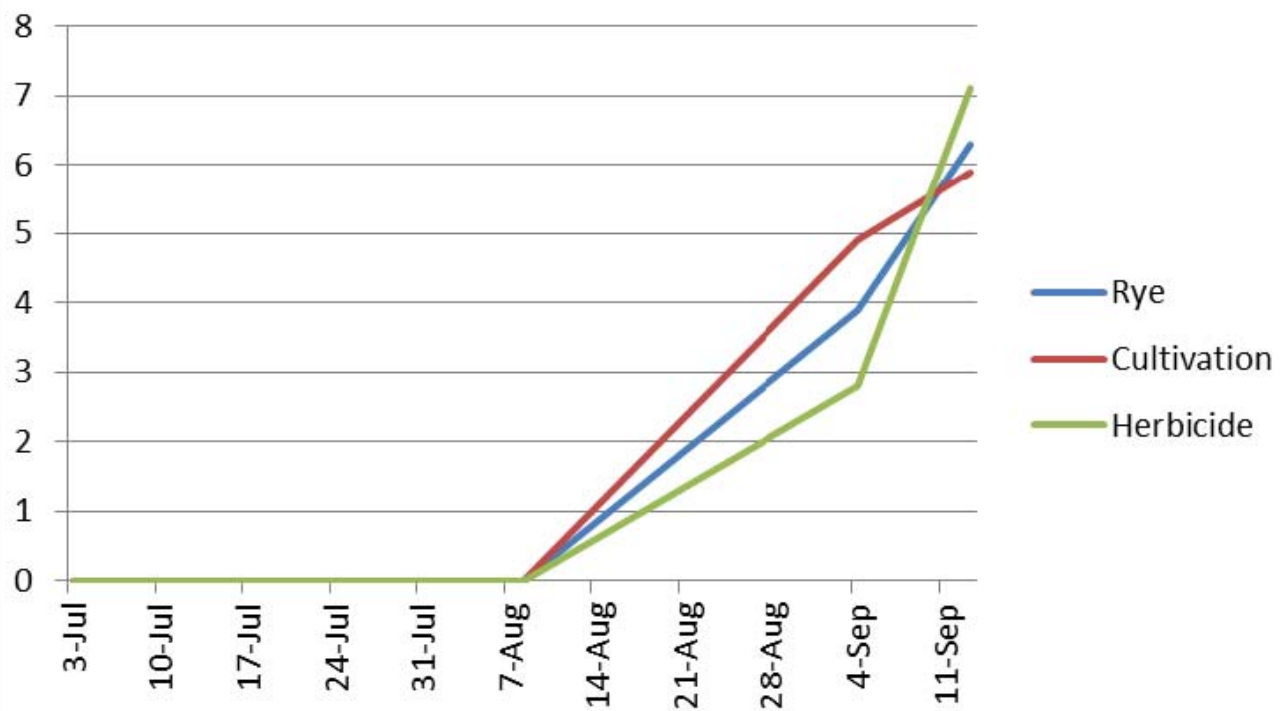


Tomato Grade as affected by Armyworm and Slug Damage on August 30

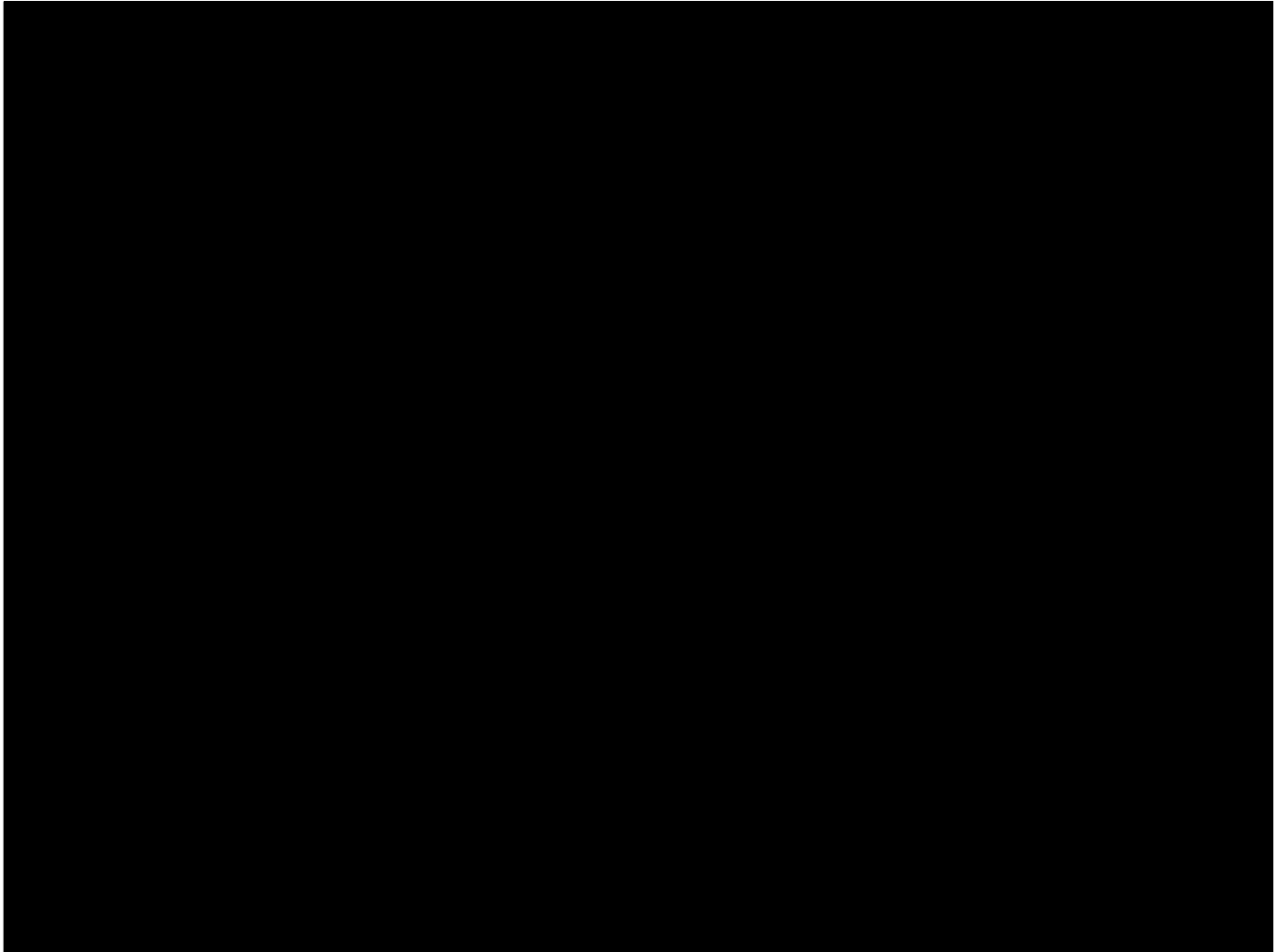




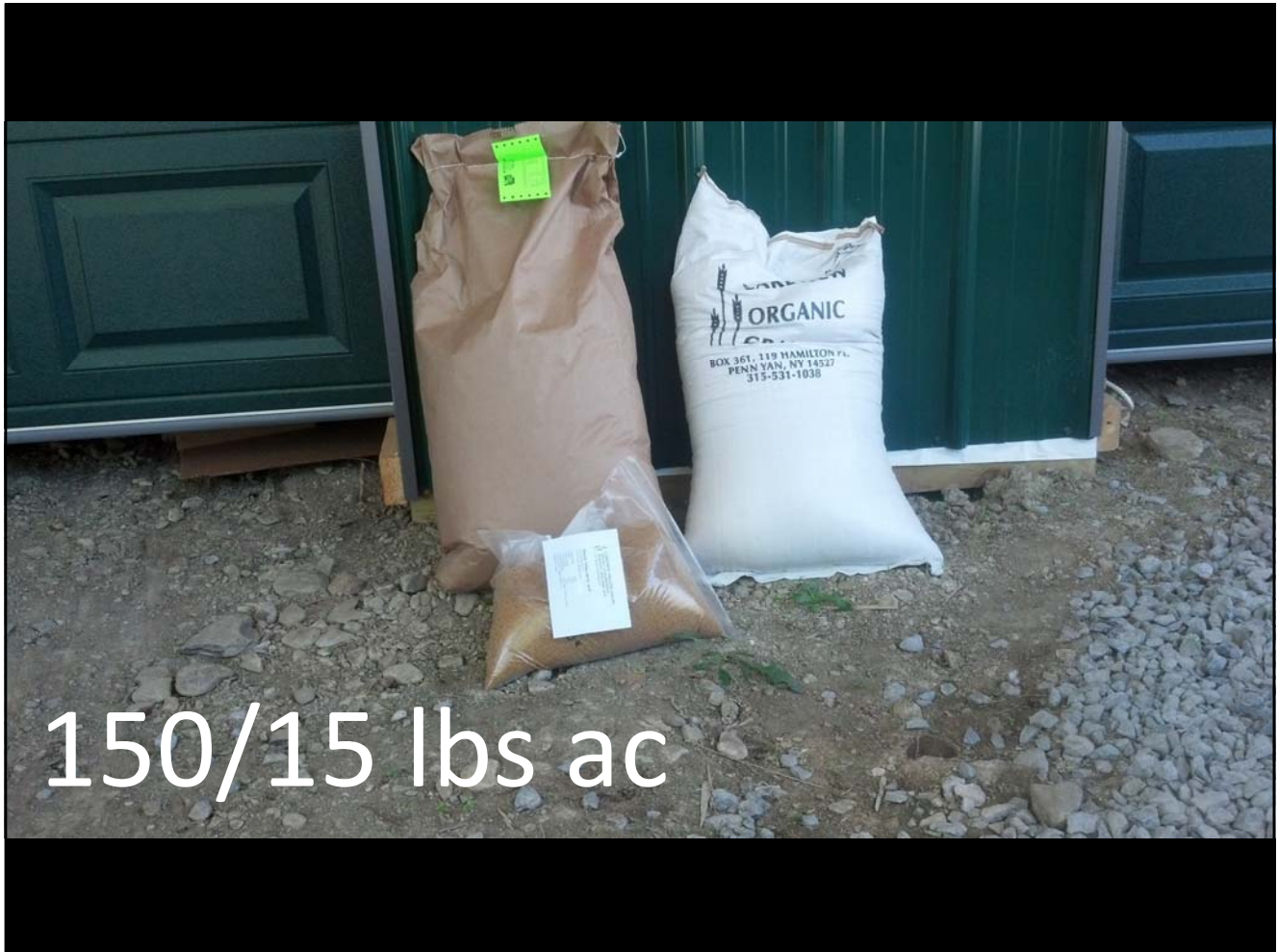
Tomato Early Blight over time













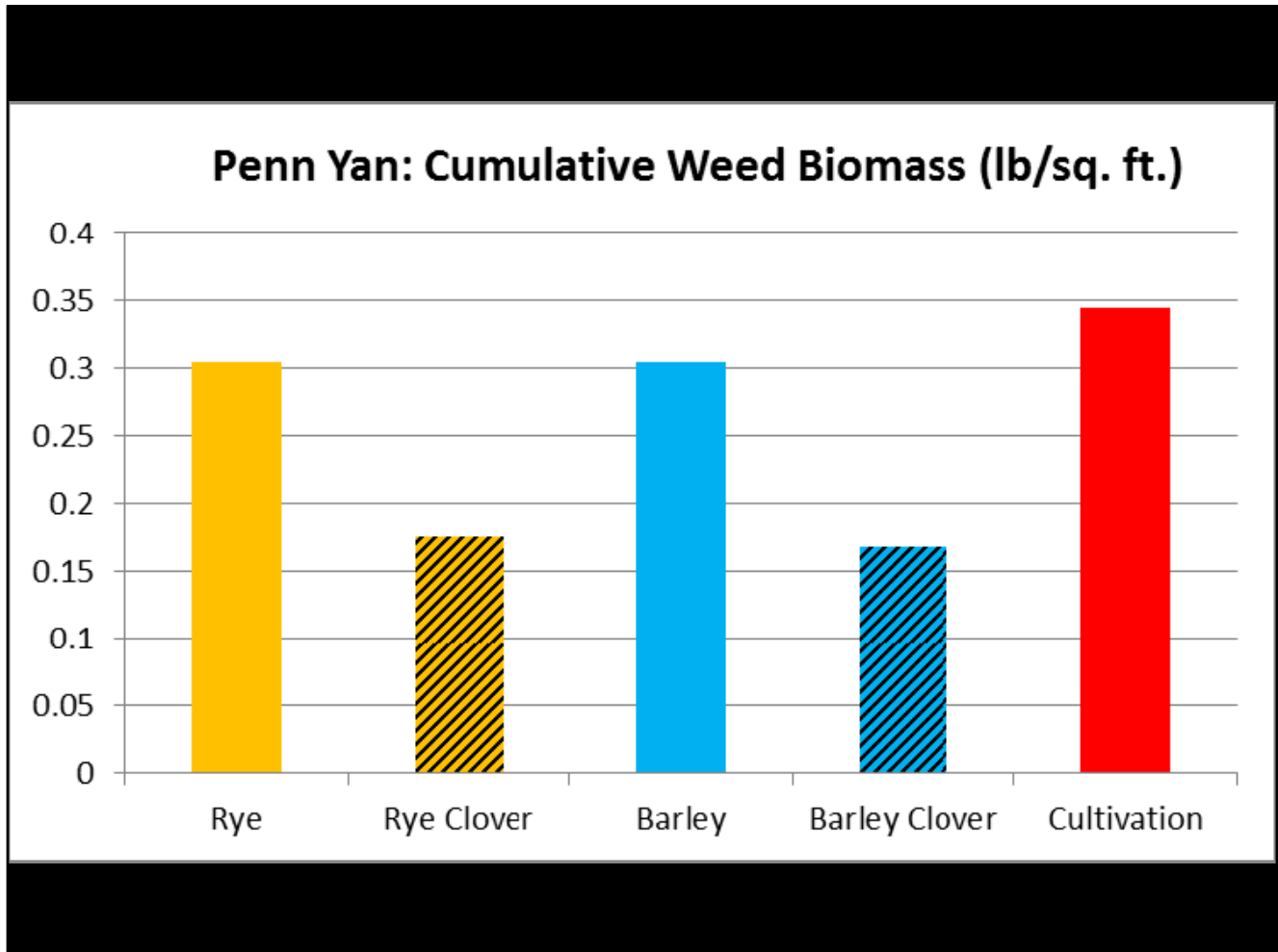


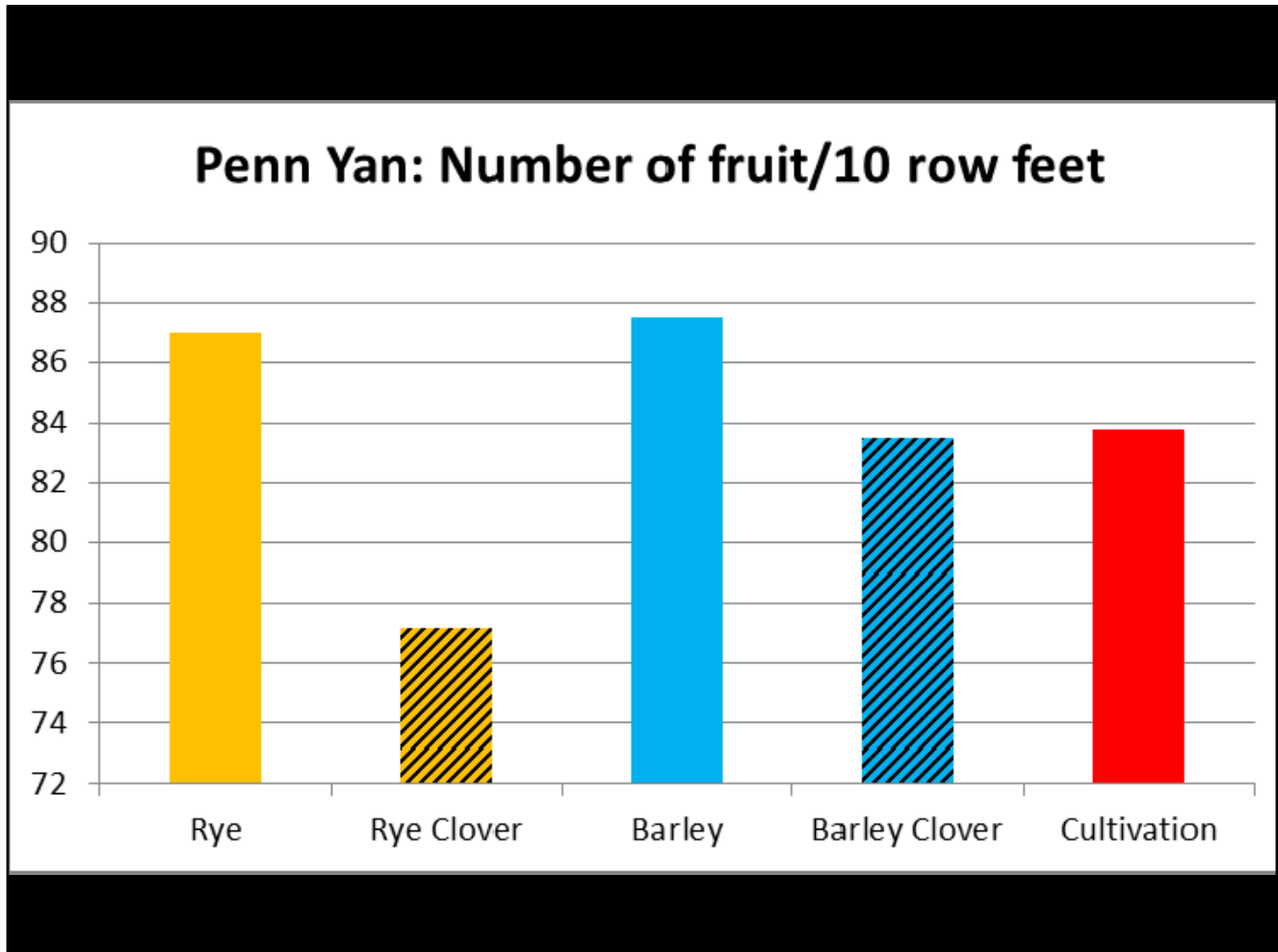


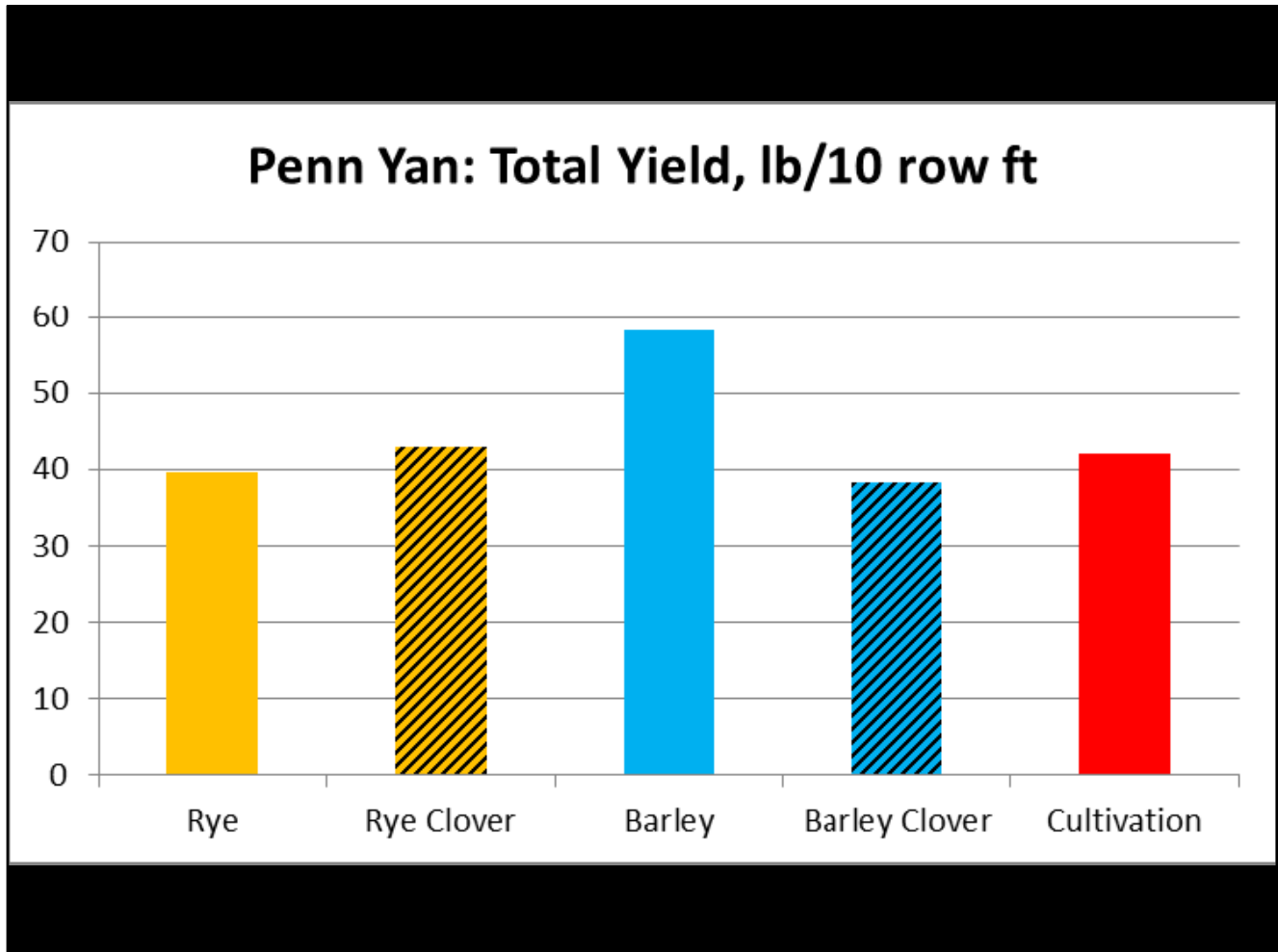




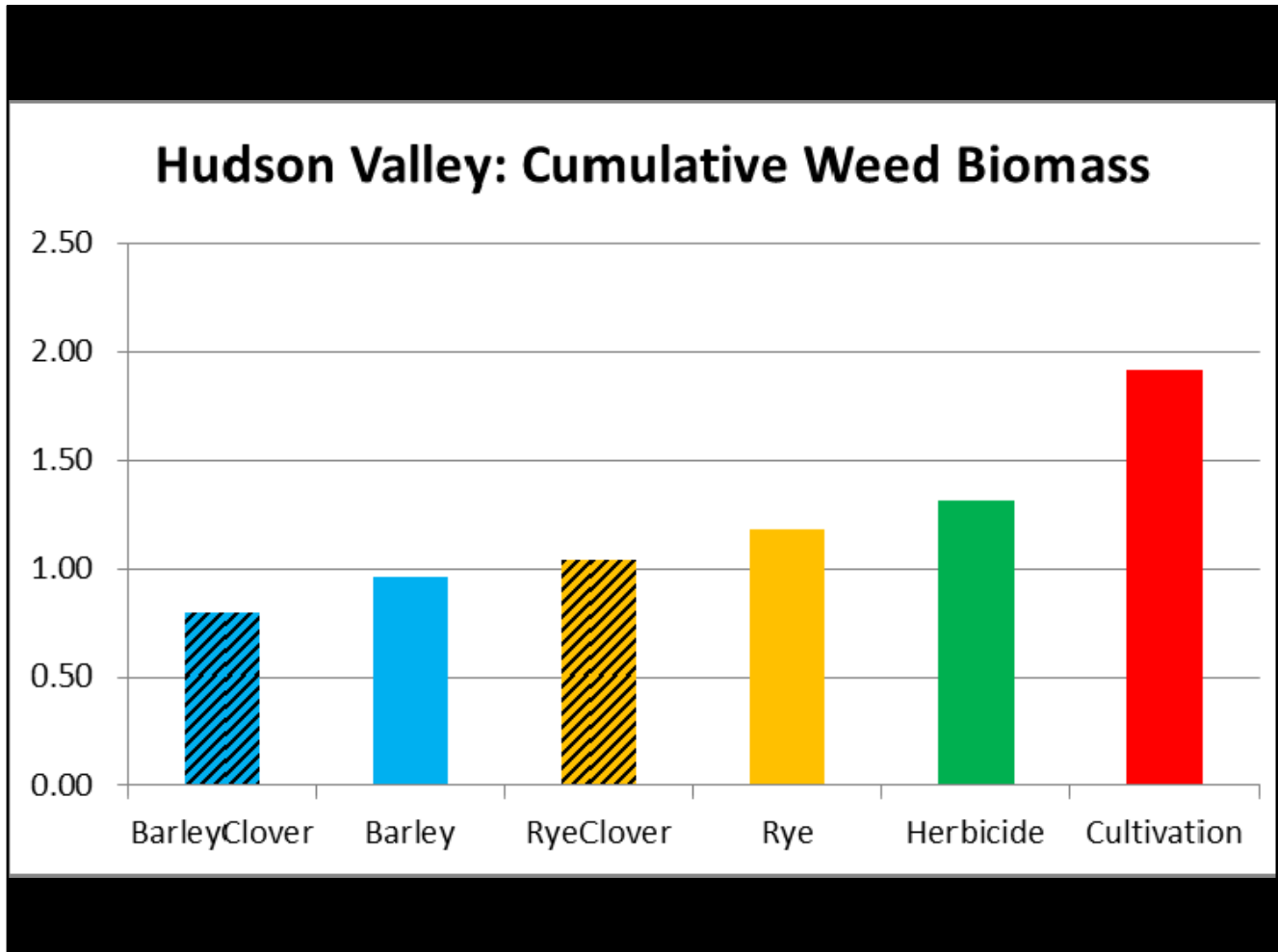


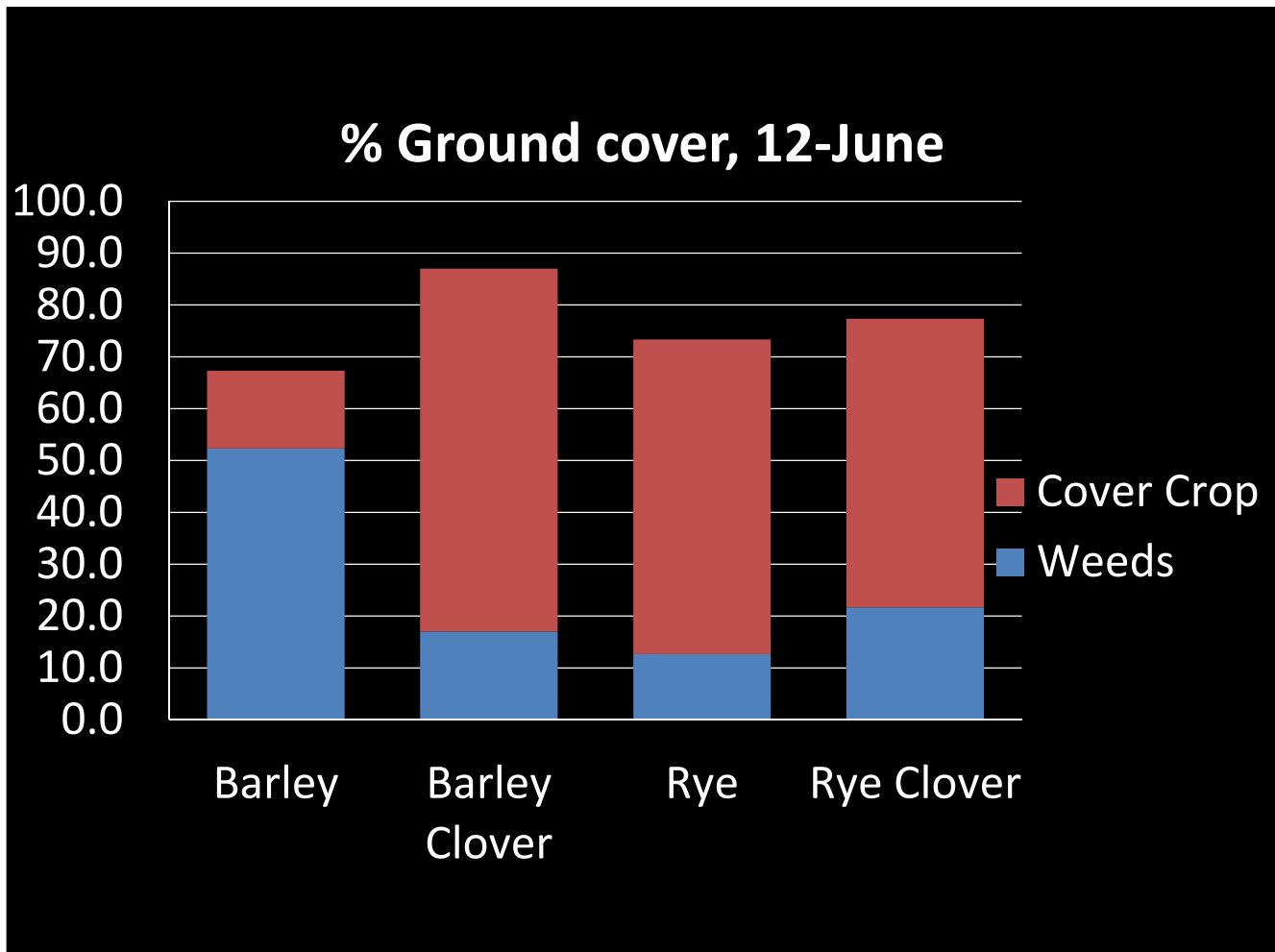


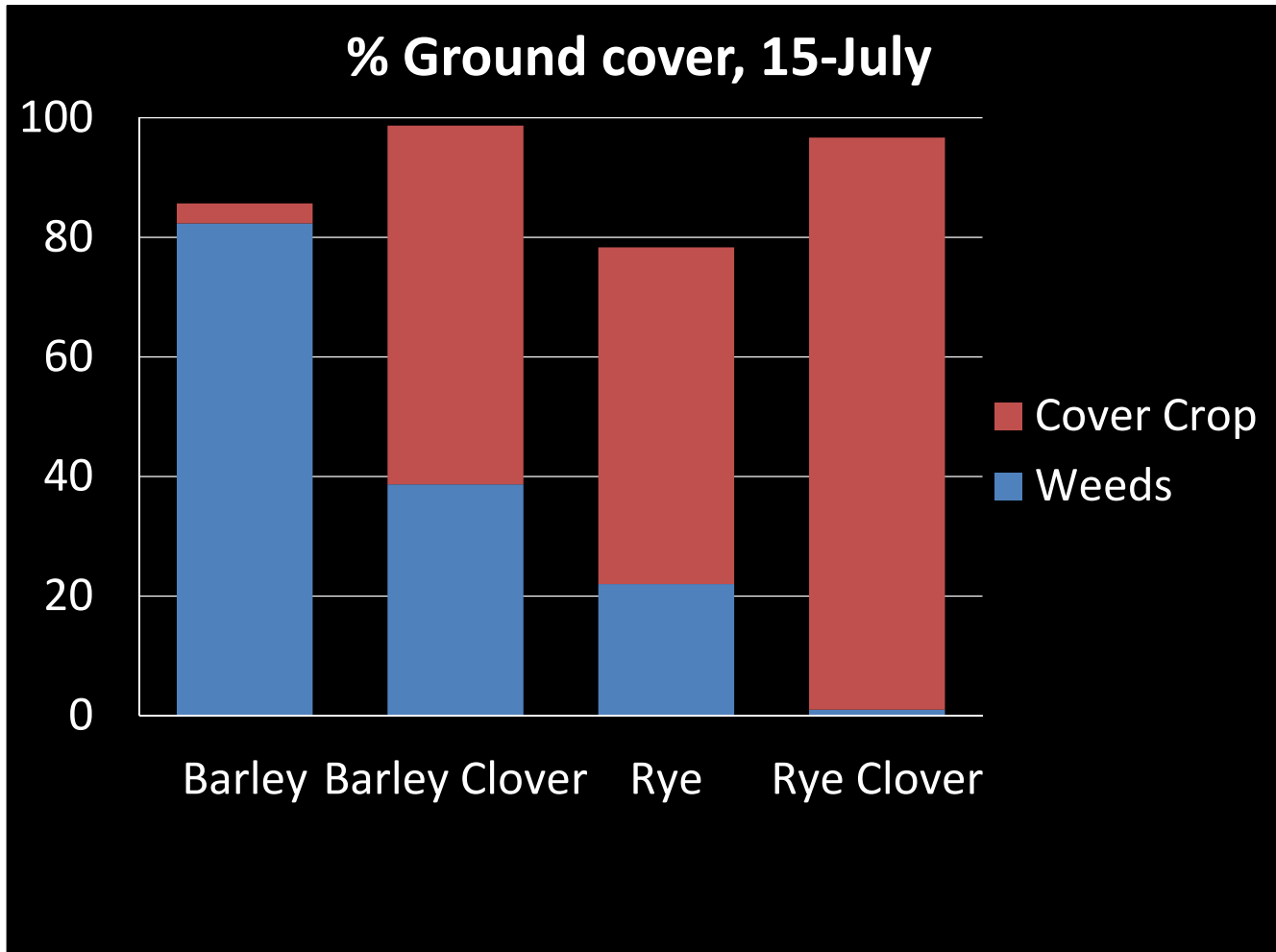


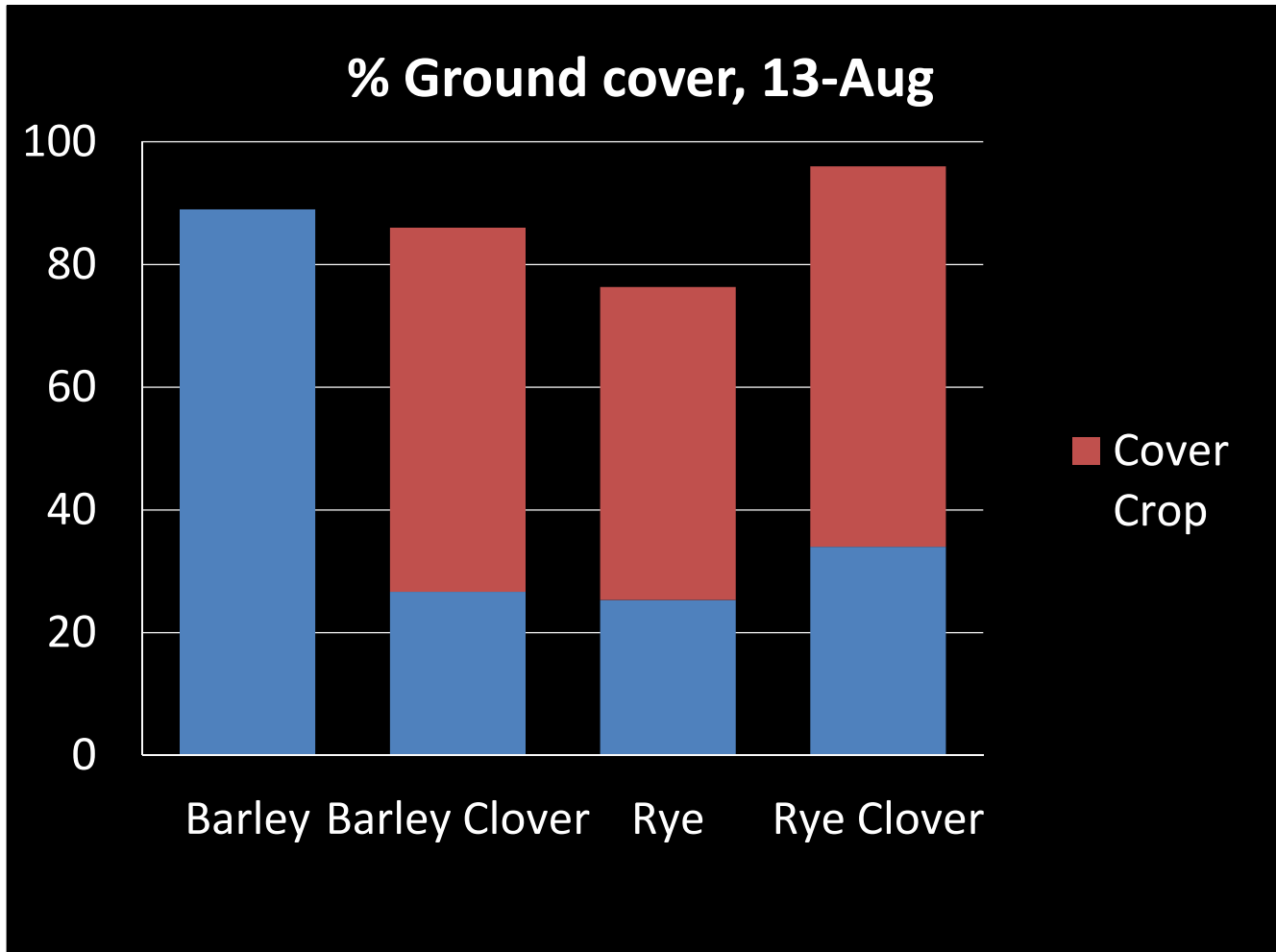


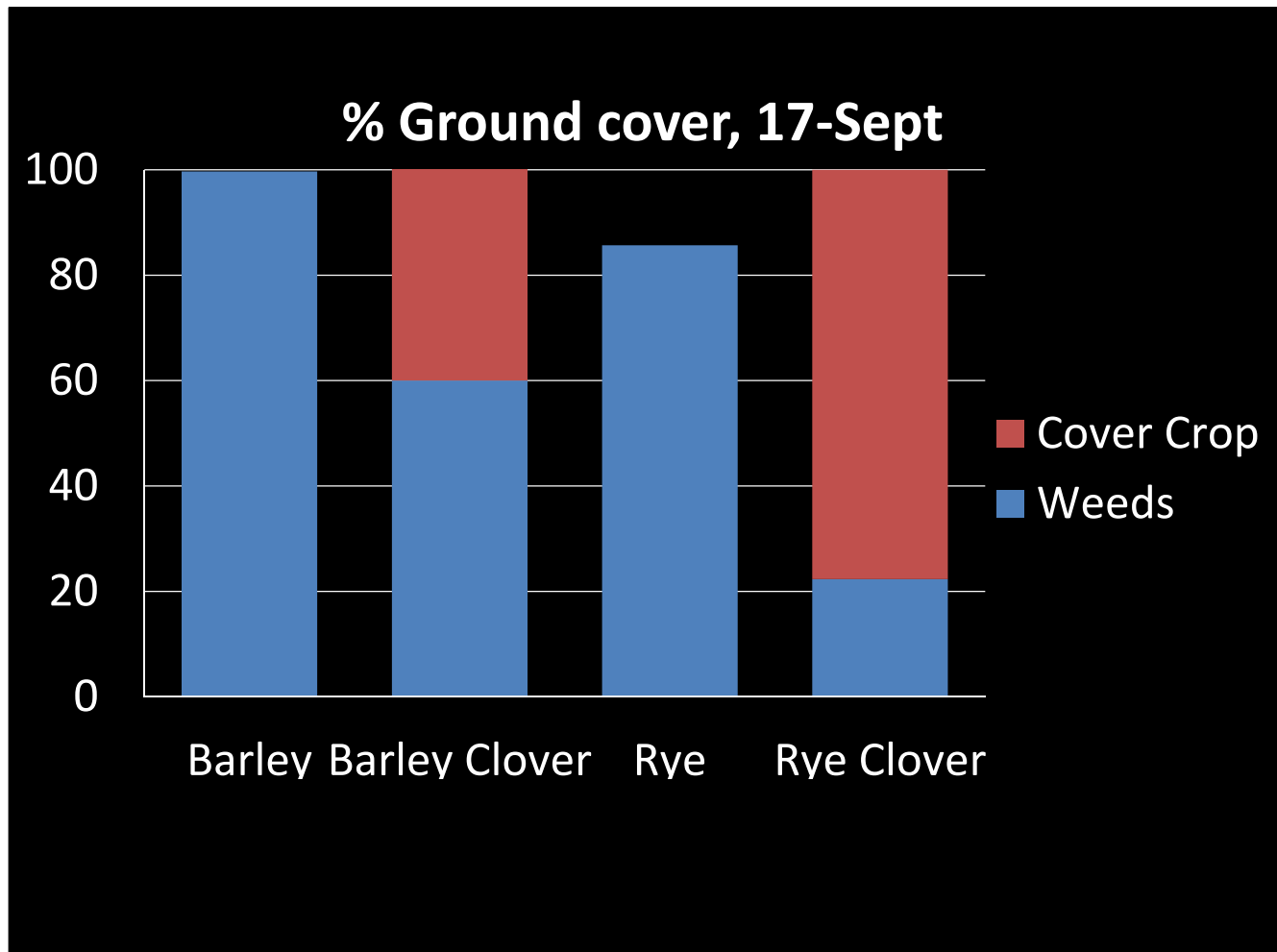








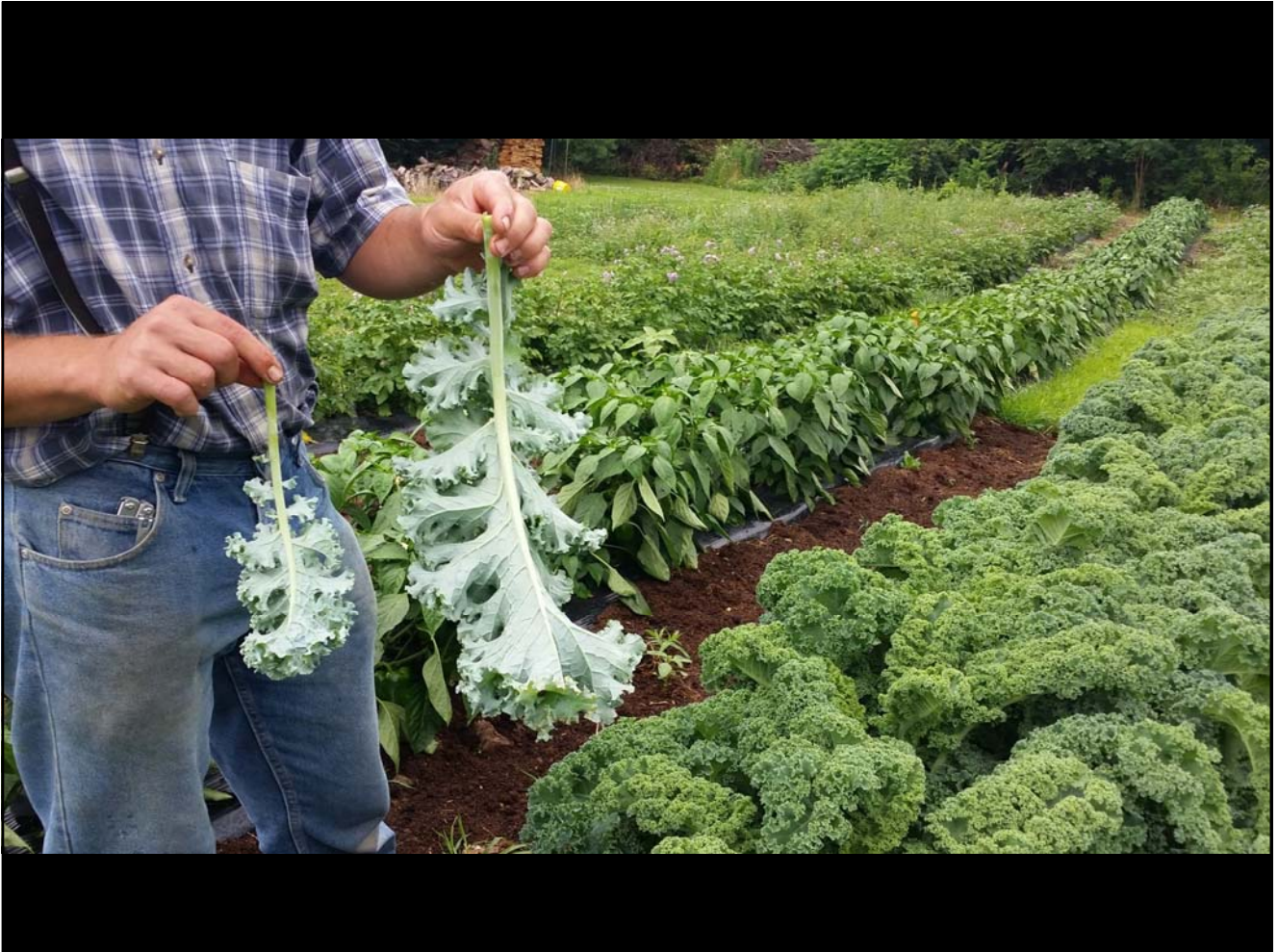




Large Bulbs

	Weight/ Bulb	No. of Bulbs	Weight (lbs)	\$ Value	% of Plot Stand	% of Plot Weight
Barley	.54 B	31.3	20.33	15.67	67.0	78.1
Barley Clover	.60 B	39.3	26.58	19.67	73.6	81.5
Rye	.58 B	33.0	21.52	16.50	70.1	78.9
Rye Clover**	0.64	46.0	29.60	23.00	78.0	79.6
Cultivate d	.76 A	42.7	33.98	21.33	71.5	74.7
p-value*	0.0416	NS (0.3092)	NS (0.1070)	NS (0.3092)	NS (0.9601)	NS (0.9376)

*Fisher's LSD at .05 significance level. **Average of two plots only. Not included in statistical analysis or significant difference groupings. A failed rye sowing in one plot rye-clover plot allowed for anecdotal observation of weed control with a clover only cover.





Take home messages:

- Year 1 problem of grain senescence became an attribute in year 2 and 3 in clover plots
- Rye reduced onion bulb size.
- Rye attracted insects in tomato plots.
- Tomato yield was lower in rye plots.
- Combined with clover rye or barley are effective at controlling weeds and may not hurt yields.
- We are not recommending this, yet...









Thanks and Questions:

- NE SARE
- Cooperating farms